sinking of two shafts through 100 feet of quicksand at Bentley Colliery. In the second Mr. H. T. Foster dealt with the subject of roof weights in mines, his views being deduced from observations in long-wall workings. Lastly, Mr. H. St. John Durnford described a deep boring put down on the Earl of Londesborough's estate, near Selby, in the hope of finding a workable seam. Although some 1060 feet of Middle Coal-measures strata were proved, boring was continued to a depth of 2371 feet without any good seam being encountered. It is probable that the bore-hole passed down through the limb of a fold where the seams had either thinned or pinched out altogether. In the afternoon of September 4 the members visited the Tinsley steel, iron, and rope works, and the East Hecla works of Hadfield's Steel Foundry Company, Ltd. At the dinner in the evening Sir William Clegg, in proposing the toast of the Institution of Mining Engineers, incidentally referred to the new Imperial College of Science and Technology, and stated that a deputation from Sheffield had waited upon Lord Crewe to urge that mining and metallurgy should be taught at Sheffield in the centre of mining and metallurgy, rather than centralised in London.

On September 5 the members visited the Clyde Steel Milling Works, Bentley Colliery, and Silverwood Colliery; and the meeting concluded with a drive, on September 6, to the Derwent Valley waterworks.

METEOROLOGICAL OBSERVATIONS.

SEVERAL reports of meteorological observatories have recently been received, and four of them are of noteworthy interest. The report of the observatory department of the National Physical Laboratory for 1906 shows that the value of the instrumental certificates is very generally appreciated; the increase in the number of instruments verified during the year amounted to more than 2900, the total being 29,567. There was a marked increase in the number of marine chronometers submitted to trial, more than 20 per cent. of which failed to pass the test. In the magnetic department the curves were free from any large disturbances. The largest movements of the seismographs occurred on January 31, April 18, and August 17, the dates of the Colombian, Californian, and Chilian earthquakes. The meteorological observations show that shade temperatures exceeding 80° were recorded in each of the four months June–September, the extreme reading being 91°·8 on September 1. Rainfall amounted to 23·68 inches (nearly half an inch below the average for Greenwich for the sixty-five years 1841–1905); the greatest daily fall was 2·36 inches on June 28, and was within half an inch of the total amount for that month.

The report of the director of the Bombay Government Observatory for 1906 gives room for little comment, excepting that the operations, which deal especially with terrestrial magnetism, meteorology, and seismology, were carried out with the usual care and punctuality. The maximum temperature was 94° on October 23, being only about 2° higher than the extreme reading recorded at the Kew Observatory. Owing to concussion from exceptionally heavy gun-firing at Colába the dry-bulb thermograph was broken in June. The yearly rainfall amounted only to 56·3 inches, being nearly 19 inches below the normal of twenty-four years (1873–96). Milne's seismograph registered fifty-nine earthquakes during the year; of these three were very great disturbances, viz. January 31, August 17, and October 24; the two first mentioned correspond to the dates of the Colombian and Chilian earthquakes.

The fiftieth year-book of the Austrian Central Meteorological Office, for 1905, contains hourly and daily observations at some selected stations, as before; the results at other stations are arranged either according to the international scheme or in tables showing monthly and yearly means and extremes. The stations number 412, of which fifty are more than 1000 metres (3280 feet) above sea level; this number in no way represents the whole of the valuable Austrian meteorological work, as there are several independent organisations dealing more particularly with rainfall and temperature, the principal of which is the hydrographic department, with more than 1000 stations, for eighty of which the observations are printed *in extenso*. The Hungarian and other meteorological services also issue separate year-books. The Vienna Meteorological Office deals specially with earthquake phenomena and with the collection and discussion of thunderstorm observations, the results of which are printed separately; it also publishes a daily weather report, and takes an active part in the investigation of the upper air by means of balloons.

In the annual report of the meteorological department of the Transvaal for the year ended June 30, 1906, the results of observations are well arranged in appendices, as before; the hourly readings at Johannesburg are not now printed *in extenso*, but MS. copies are available, on loan, for special inquiries. The stations have increased in number to 376, most of which record rainfall only; all the observers are volunteers, or are attached to other departments. The rainfall was considerably below the average in all parts except in the S.W., where the defect was only slight; no snowfall was reported during the year. A forecast of the weather for the ensuing twenty-four hours is now exhibited at every postal telegraph station in the Transvaal. The director (Mr. R. T. A. Innes) seems dissatisfied with the Campbell-Stokes sunshine recorder, which only shows the time during which the sun is sufficiently powerful to burn the cards; in future reports both the duration and burning times will be given.

RUSSIAN SCIENTIFIC WORKS.

THE Imperial University of Kazan, with its society of naturalists, is noted for excellent work in many departments, and we are greatly impressed with the magnitude of Mr. M. Ruszky's volume "The Ants of Russia" (*Formicariae Imperii Rossici*), of which the first part lies before us. It consists of 800 pages, with 176 sketches, comprising an introduction, bibliography, systematic examination of Russian ants, list of collectors to whom the author is indebted, and indexes. Mr. Ruszky began the study of Russian myrmecological fauna in 1892, when he undertook a zoological excursion in the Kazan and Simbirsk governments on behalf of the Society of Naturalists. He was induced to take up this investigation partly because Russian ants had been very little studied, and partly for the collection of materials for the solution of biological and zoo-geographical questions. This work is to be understood as a preliminary array of results, being an attempt at a description of Russian ants in systematic geographical and biological respects. The author anticipates criticism for omission of questions of internal morphology and embryology, and observes that such exhaustive treatment of the Formicidæ by a single investigator would occupy, not one, but many decades. In the important bibliography of writings on ants, occupying with addenda about seventy pages, very few works are devoted to Russia, chief among the number being twelve by the author. Mr. Ruszky estimates the approximate total of species and subspecies known at the time of writing at 3500, and groups Russian ants under the subfamilies Camponotinæ, Dolichoderinæ, Myrmecinæ, and Ponerinæ. Representatives of Dorylinæ, principally found in the tropics, have not been seen in Russia, though one species (*Dorylus juvenculus*) is European, being found in southern Italy, Sicily, &c. After some useful preliminary notes and tables of species of Russian ants, the author proceeds to detailed descriptions of smaller groups. In all, 258 forms are described (155 species and races, 103 varieties), of which sixty are new and treated for the first time (subfamilies, Camponotinæ, 109; Dolichoderinæ, 7; Myrmecinæ, 138; and Ponerinæ, 4). The regions richest in myrmecological fauna are the Caucasus, with 130 forms; Russian Central Asia, about 112; European Russia, 92; Siberia, 71; Crimea, 43; and Finland, 32. All these figures are approximate, and it is probable that since this work appeared more results have been recorded. This first part gives geographical distribution, locality, and biological information, and in the second Mr. Ruszky proposes to deal with this fauna from the bio-geographical point of view.

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Society of Naturalists, edited by Mr. J. Borodine, is devoted to botany. Mr. Y. N. Voronoff describes his botanical excursion in the summer of 1902 in Abhasia (Caucasus). The whole region is rich in Alpine flora, of which the writer collected thousands of specimens and hundreds of species. Mr. Voronoff supplements Alboff's work on the flora of Colchis, and gives a list of 129 plants, of which four are newly described. Mr. E. Ispolatoff's article on the vegetation of the eastern portion of the Novgorod government contains descriptions and lists of that found in forest, marsh, and meadow land respectively, with observations on the influence of man upon local vegetation. He notes that localities suitable for human habitation are also favourable to vegetation. The presence of primitive Siberian flora in certain districts is accounted for by the wild, sparsely populated nature of the country, as contrasted with the more cultivated areas of western Russia. Mr. Ispolatoff gives a list of local names of plants, *e.g.* *Cypripedium calceolus* (Adam's head), *Aegropodium podagraria* (bear's paw), Ranunculus (jaundice, hen's blindness). The bulk of the journal is occupied with Mr. Leonid Ivanoff's papers on phosphorus and its relations to plant life, with results of experiments. Mr. J. L. Serbinoff furnishes preliminary notes on water plants and fungi of the Crimea, a field scarcely studied. The mountain districts are poor in water plants, while there are more in the south, but on account of their comparative rarity considerable time must elapse before a complete list can be compiled.

There is a wealth of interest for the geologist in part v. of vol. xxxiii. of the Transactions of the St. Petersburg Society of Naturalists, devoted to geology and mineralogy. Mr. W. Lemann writes on the Jurassic deposits of Orlovka, and furnishes a plate of fossils. Mr. B. Popoff describes a new method of investigating spherolithic formations, with diagrams. Besides notes on diabasic rocks on the shores of Lake Onega, by Mr. S. A. Jakovleff, and on the island of Pargas, by Mr. Sustchinsky, Mme. Jeremina and Mr. Loewinson-Lessing describe expeditions in the Mugodjaren (Ural) mountains, and the former writes on the spherolithic formations in this range, with numerous illustrations. *Résumés* of the articles appear, mostly in German.

In part ix. of vol. xxxvii. of the Journal of the Physico-chemical Society of St. Petersburg University appears a list of minutes and papers, the volume containing more than 1300 pages. Mr. V. Menschutkin writes on the action of water on etherates and combinations with ether-salts, and Mr. A. Gorboff on the static character of the equilibrium of physicochemical systems. Mr. E. Orloff furnishes a new synthesis of benzylideneimides, and a lengthy paper on the phosphorescence of some organic compounds between +100° and −190° appears from the pen of Mr. P. Borissoff. The purpose of Mr. Borissoff's work was to examine the influence of temperature on the phosphorescence of certain organic compounds, and to determine the relation of fluorescence to phosphorescence. A memoir of Mr. V. A. Mokievsky, a promising laboratory worker cut off all too soon, is given by Mr. S. Lebedeff.

In part ii. of vol. xxxv. of the Transactions of the St. Petersburg Society of Naturalists, Mr. V. N. Tonkoff describes experiments in embryology in connection with dual formations, and gives a bibliography of works on embryology, development, abnormal formations, &c. The writer appears to be of opinion, judging by results of experiments by pressure and osmosis on the eggs of frogs, fish, and medusæ, that similar results would be produced in the case of other ova. This article is illustrated by two plates. Mr. A. V. Zhuravsky contributes notes of a zoological journey in the Siberian tundra. This region, largely volcanic, has been summed up as "dead land (*i.e.* clay) and lakes." For the naturalist there is abundant material for study in the lakes and on the sloping shores. Of the fauna, *Mus amphibius* is very prevalent, and finds its way on board steamers and other craft as an emigrant. A list of mollusca occupies several pages. A short *résumé* in German follows each article.

Vol. xxxv., part iv., of the Transactions of the St. Petersburg Society of Naturalists, devoted to zoology, is chiefly taken up with articles by Mr. W. M. Schimkevitch, one of the editors. He is responsible for notes on the development of Thelyponus, experimental observations of the eggs of *Philine aperta*, and a preliminary article on the theory of mutation. His paper of more general interest is that on the instincts of domestic animals, in which certain well-known habits of the dog are discussed, as burying of bones, &c., without apparent reason. Most of these are followed by a German *résumé*. The concluding article, by Mr. S. Susloff, treats of phagocytes in relation to insects, with diagrams and a bibliography.

Mr. N. Andrussoff has issued part i. of his materials for the geology of the Aralo-Caspian region (Transactions of the Aralo-Caspian Expedition), which he has studied for twenty years at intervals. The places covered in this part include the Krasnovodsk peninsula, Great and Little Balchan, Djanak, and Ustiurt. Notwithstanding its proximity to Krasnovodsk and the railway, the geological features of the Kubadagh have been very little studied. In his first chapter Mr. Andrussoff summarises the work of previous explorers since Eichwald visited the neighbourhood in 1825. The work is illustrated with plans, sections, and views.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

THE professor of mechanical engineering at the City and Guilds Technical College, Finsbury, is about to appoint a chief assistant to take charge of the new engineering laboratory. Particulars of the appointment will appear in our advertising columns.

THE question of the extent of the training in science, and especially in physics, which one who intends ultimately to become a physics teacher should receive at the high-school stage of his career, is treated with great insight by Dr. K. T. Fischer, of Munich, in a recent article in *Natur und Schule*. It will be remembered that Dr. Fischer spent some time in this country investigating our methods of teaching science, and that his observations are embodied in his book "Der naturwissenschaftliche Unterricht in England." His present article is largely a plea that even at this stage the future teacher should be brought into close contact with physical apparatus, and should be taught to handle simple tools and fit together apparatus. Dr. Fischer's ideal of a teacher is one who by the end of his training has not only learnt to read with understanding the original work of the great masters, but has carried out a piece of research himself. He recognises, however, the difficulty of his last demand even in his own country, and we in this country must, we fear, look on it as a counsel of perfection for many years to come.

THE new syllabus of classes at the Sir John Cass Technical Institute, Aldgate, shows that the work of the various departments has been considerably re-organised since last year. Apart from systematic courses in physics, mathematics, and chemistry, special courses of instruction are now given in physical chemistry, brewing and malting, and in several branches of advanced physics, including radio-activity. The course in physical chemistry includes general physical chemistry, electrochemistry, and a laboratory course of practical work; the instruction in brewing and malting also includes laboratory work of a technical character in addition to a course of lectures designed for those engaged in the brewing and malting industries. The teaching in metallurgy, which for the past four years has formed a distinctive part of the work of the institute, has now been established as a separate department, and a full graded curriculum extending over three years is provided.

THE London County Council desires to direct attention to the facilities offered for evening instruction in the various institutions maintained by it or under its control. In the various polytechnics, technical institutes, and schools of art situated in the county, classes in science, art and technology, music, artistic handicrafts, &c., will be re-opened towards the end of the present month. These institutions provide instruction of an advanced or technical character. The council offers annually scholarships and exhibitions to the total value of 1500*l.* for competition among students of polytechnics, technical insti-

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